

Example #3: A train is moving directly south at uniform speed. If, at this location, the vertical component of the Earth's magnetic field is $5.4 \times 10^{-5} \text{ T}$, and the EMF induced in a 1.2 m-long car axle is $6.5 \times 10^{-5} \text{ V}$, how fast was the train going?

$$B_{\perp} = 5.4 \times 10^{-5} \text{ T}$$

$$l = 1.2 \text{ m}$$

$$\mathcal{E} = 6.5 \times 10^{-5} \text{ V}$$

$$\mathcal{E} = v B l$$

$$6.5 \times 10^{-5} = v (5.4 \times 10^{-5}) (1.2)$$

$$v = 1.0 \text{ m/s}$$